

A FAST, SIMPLE TECHNIQUE FOR EXAMINING THE STRIDULATORY FILE OF KATYDIDS WITH LONG WINGS (ORTHOPTERA: TETTIGONIIDAE)¹

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ABSTRACT: The stridulatory file of long-winged tettigoniids is easily studied by mounting it on the side of the tegmen and studying it with a compound microscope illuminated from the side with a pencil beam illuminator.

Male ensiferan Orthoptera produce species-specific sounds that function in sexual pair formation. Sound is produced by moving a series of teeth (*stridulatory file*) at the anal field of one tegmen against the sclerotized anal edge (*scraper*) of the other tegmen. In recent years morphological differences of the stridulatory file have been used in the classification of species or species groups, or in studies of orthopteran acoustic mechanisms (e.g., Alexander *et al.*, 1972; Bailey and Broughton, 1970; Emsley *et al.*, 1967; Ragge, 1969; Rakshpal, 1960; Sellier, 1969; Walker, 1975; Rentz & Weissman, 1981). The number of file teeth and length of stridulatory file or file vein have been most frequently reported. The shape and spacing of the teeth also have been used.

The stridulatory file has typically been examined by removing it, or the entire tegmen, and mounting it on a microscope slide in a suitable medium — e.g., Hoyer's medium, alcohol, or glycerin. File characters are studied with a compound microscope using transmitted light. After measurements are made additional labor is required to reassociate the file vein or tegmen with the proper specimen from which it was removed. This often includes dissolving a coverglass from the slide, drying the wing part, and gluing the wing part to a card point on the pin with the specimen. Sellier (1969) and Walker (1975) have made electron micrographic studies of the stridulatory file. These procedures require considerable time, especially when many specimens are involved. Ragge (1969) described a technique using a pyroxylin film to form replicas of the stridulatory file. The film replica was studied effectively with a microscope.

My technique involves permanently mounting the file vein on the side of a tegmen (Fig. 1). It provides accurate results in minimum time and is applicable to any fully winged tettigoniid.

The file vein is chipped off dried specimens with a sharp pin, or cut off fresh and alcoholic specimens, taking care to remove enough of the wing to

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get all of the file. A drop of white glue (*e.g.* Elmer's Glue-All) is placed on the side of the tegmen. Pin holes are made in the tegmen under the glue to allow the glue to adhere. Not perforating the tegmen may allow the glue to dislodge when dry. The file vein is mounted in the glue upside down with the axis of the vein parallel to the wing length. Glue is pressed into the broken edges of the wing chip to insure it bonding securely. The file vein is ready for study as soon as the glue sets. It will not have to be handled again. There is no chance to confuse which file vein to associate with a specimen since only one specimen is handled at a time while translocating the file vein.

The file vein is studied with a compound microscope equipped with ocular micrometer or a stereomicroscope. In either case a strong pencil beam illuminator focused directly on the subject is used. The angle of the light beam can be changed as needed to help discern structures.

To facilitate observing the specimen with a compound microscope. I use a 5 cm x 12 cm soft-wood board with a 15 cm shoulder mounted at right angles (Fig. 1). The specimen pin is stuck into the shoulder so that the specimen is flat with the surface of the board. The board is laid on the mechanical stage apparatus (not held in it) which is then moved around for observation.

All teeth in the stridulatory file should be used in the tooth count to insure other researchers being able to duplicate the procedure. The small teeth at either end of the file vein may be difficult to discern. These teeth are

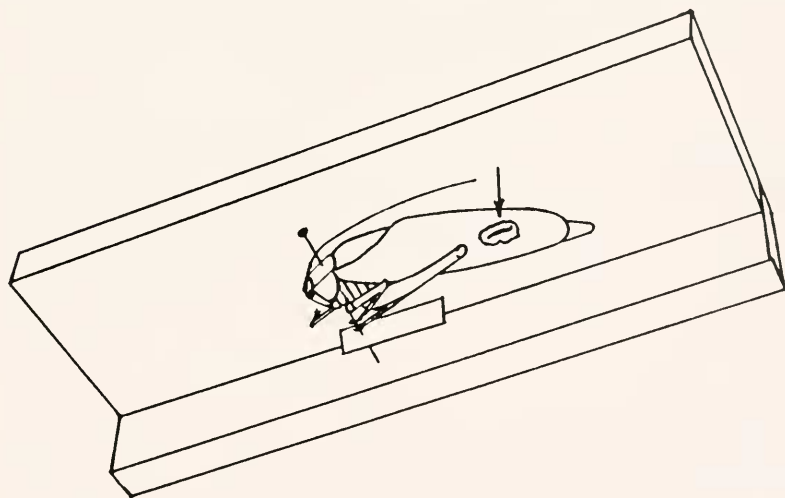


Fig. 1. Sketch showing soft-wood board with katydid mounted for study of stridulatory vein (arrow) which has been translocated to the side of the tegmen.

usually spaced wider than other file teeth and are thus easily studied with a high powered stereomicroscope.

This entire procedure permits obtaining stridulatory file characteristics in less than five minutes with no follow-up labor. When a series of specimens is involved several specimens can be prepared in sequence before examining them. The average time of handling a specimen is then considerably shorter. The obscurity of detail of the tegminal area covered by the translocated part presents no problem, since the other tegmen remains untouched.

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ANNOUNCEMENT

On the occasion of naming the Museum of Invertebrates, University of Panama, in honor of Graham Bell Fairchild, a volume of contributions to the systematics of insects of Panama will be published. Articles on systematics, including well illustrated keys, on insect groups present in the Isthmus of Panama are solicited. Deadline for submission is December 10, 1986. Dedication ceremonies will be held February 10-11, 1987. To submit articles and for more information, contact Dr. Diomedes Quintero Arias, Museo de Invertebrados, Estafeta Universitaria, Panama, Republica de Panama.